



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,944	09/15/2003	Stephen E. Derenzo	IB-1833	2024

8076 7590 11/12/2004

LAWRENCE BERKELEY NATIONAL LABORATORY  
ONE CYCLOTRON ROAD, MAIL STOP 90B  
UNIVERSITY OF CALIFORNIA  
BERKELEY, CA 94720

EXAMINER

KOSLOW, CAROL M

ART UNIT	PAPER NUMBER
----------	--------------

1755

DATE MAILED: 11/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/662,944

Applicant(s)

DERENZO ET AL.

Examiner

C. Melissa Koslow

Art Unit

1755

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6, 9, 10, 13-16, 18 and 19 is/are rejected.
- 7) ☒ Claim(s) 4, 7, 8, 11, 12 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged. However, the provisional application upon which priority is claimed fails to provide adequate support under 35 U.S.C. 112 for claims 13-19 of this application.

The provisional application does not teach codopant amounts of about 0.01-1 mol%, that the semiconductor is GaN, ZnTe, CuI, PbI<sub>2</sub> and HgI<sub>2</sub>, that the codopants for CdS are selected from Ga or Al and from Te, Ag, Na or Li or is In and one of Ag, Na and Li and that the codopants for ZnO is Ga and one of N and S. While the provisional application teaches the amount of each codopant in ZnO:Ga,P is about 0.1-0.2 mol%, it is not clear that this amount is for all taught codopants in all the taught semiconductors disclosed in the provisional application.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-3, 5, 6, 15 and 16 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. patent 3,602,753.

Table I teaches a phosphor of CdS:Al,Ag. The aluminum dopant provides electrons and the silver dopant traps holes. The reference teaches the claimed scintillator.

Claims 1-3, 5, 6, 15 and 18 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by U.S. patent 6,674,098.

Claims 1-3, 5, 6, 15 and 18 are rejected under 35 U.S.C. 102(b) as being clear anticipated by WO 01/08229.

U.S. patent 6,674,098 is the translation for WO 01/08229.

Both of these references teach ZnO doped with Ga and N (col. 9, lines 30-33). The gallium dopant provides electrons and the nitrogen dopant traps holes. The reference teaches the claimed scintillator.

Claims 1-3, 9, 10, 15 and 19 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. 6,140,669.

Art Unit: 1755

Table I teaches a phosphor of GaN:Si,Dy and GaN:Si,Er. The silicon dopant provides electrons and the erbium or dysprosium dopant traps isoelectronic holes. The reference teaches the claimed scintillator.

Claims 1-3, 5, 6, 15 and 19 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. 5,976,412.

This reference teaches a phosphor of GaN:M,X, where M is Be, Mg, Ca, Sr, Ba, Zn, Cd and Hg and X is C, Si, Ge, Sn and Pb. Examples 1 and 2 teach GaN:Mg,Si and GaN:Mg,Ge. The X dopant provides electrons and the M dopant traps holes. The reference teaches the claimed scintillator.

Claims 1-3, 5, 6, 9, 10, 15 and 19 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. 3,027,329.

This reference teaches a codoped phosphor of GaN (claim 2). The taught primary dopants all provide electrons and the secondary dopant sulfur, selenium and fluorine trap holes. The taught oxygen and tellurium secondary dopants trap isoelectronic holes. The reference teaches the claimed scintillator.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 3,027,329 or U.S. patent 5,976,412.

As discussed above, both of these patents teach the claimed scintillator. In U.S. patent 5,976,412, the amount of the M dopant is in the range of  $0.005 \text{ mol\%} < M < 0.7 \text{ mol\%}$  and the amount of X dopant is  $0.002 \text{ mol\%} < X < 0.8 \text{ mol\%}$ . U.S. patent 3,027,329 teaches the amount of each codopant is in the range of 0.001-1 mol%. All of these ranges overlap the claimed ranges. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The references suggest the claimed scintillator.

Claims 4, 7, 8, 11, 12 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

There is no teaching in the cited art of record of compounds having the formulas in claim 17. There is no teaching or suggestion of inorganic scintillator or luminescent materials comprising a direct-gap semiconductor, a codopant that provides holes or an acceptor band and a codopant that traps electrons, or provides one of a donor trap recombination or an isoelectronic electron trap recombination.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Koslow whose telephone number is (571) 272-1371. The examiner can normally be reached on Monday-Friday from 8:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Bell, can be reached at (571) 272-1362.


The fax number for all official communications is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

Art Unit: 1755

applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cmk  
November 9, 2004

  
\_\_\_\_\_  
C. Melissa Koslow  
Primary Examiner  
Tech. Center 1700